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Division Director

State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

355 West North Temple
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Salt Lake City, Utah 84180-1203
801-538-5340

September 6, 1992

TO: Minerals File

FROM: Holland Shepherd, Senior Reclamation Specialist HWS

RE: Site Inspection of the Small Fry Mine, M/037/022, W.K. Enterprises, San Juan County, Utah

Date of Inspection:	August 31, 1992
Time of Inspection:	2:00 p.m. to 4:00 p.m.
Conditions:	Sunny, warm
Participants:	Dave Shoemaker, Gary Morris, Molycorp; Mike Shumway, Dick Shumway, W.K. Enterprises; Sal Venticinque, BLM; and Holland Shepherd, DOGM
Purpose of Inspection:	Evaluation of site for repository of NORM wastes and transfer of mining permit

Dave Shoemaker of Molycorp contacted me about 3 weeks ago concerning the purchase of the Small Fry Mine. Molycorp, a subsidiary of UNOCAL, wants to acquire the site from W.K. Enterprises for the purpose of utilizing the underground workings for a repository of vanadium ore tailings. The Small Fry is located on predominately patented property; a small portion is a Federal ground. According to maps and our discussions with Molycorp personnel, the area to be used for storage is all patented. The only part of the mine to affect federal property will be on the surface.

The area which is federal property was reclaimed by W.K. Enterprises last year. The BLM has already released this portion of the site from further reclamation obligations. The BLM accompanied us on this inspection, because of their concern for any offsite impacts which might occur from the proposed activity.

According to information supplied to me by the operator (see attached), the Normally Occurring Radioactive Material (NORM) waste material consists of @20,000 yd^3 of vanadium wastes and contaminated soil material. The vanadium wastes comprise @4,000 yd^3 and the remaining soil material comprises @16,000 yd^3 of material.

According to Mr. Shoemaker, the Utah Division of Radiation Control (DRC) has categorized the waste material as NORM. Molycorp has provided DRC and DOGM with an analysis of the material (see attached). Material that is rated as NORM requires no regulation by the Nuclear Regulatory Commission. Such material is typically treated the same way as waste or overburden material generated at a uranium mine site. According to the operator, this material should be no more radioactive then material that was once mined out of the Small Fry, or native materials which remain in the mine.

The vanadium wastes/tailings which Molycorp hopes to deposit at the Small Fry originate from a site @8 miles south of the Small Fry, on land owned by Molycorp (Unocal), and utilized for Gas production. The material was generated in the 1930's, prior to Molycorp's acquisition of the site. The material presently sits above ground and is uncovered. Because of its surface exposure it presents a low level radiation hazard. According to Larry Anderson of the Utah Division of Radiation Control, locals were using the material for fill on various home projects, which is causing great concern to DRC.

Molycorp has been asked to cap the material by DRC. An alternative plan was initiated by Molycorp, with the realization that the best disposition for the material would be to be place back underground. DRC is in favor of the plan, providing approval via DOGM and the Division of Water Quality Control (DWQ).

Molycorp has also contacted DWQ concerning the relocation of this material. DWQ has indicated that they are in favor of the proposal, as long as the question of de minimus (inconsequential) impact to groundwater can be verified. This question must be addressed via existing groundwater information, which addresses the location of local aquifers. Molycorp offered to do some homework on this subject. I offered to research the question via information available at the Division. The Division has been working a non-compliance issue associated with the Keystone-Wallace waste water pit, located @.5 miles east of the Small Fry mine. Also Rio Algom has performed a comprehensive evaluation of the Lisbon Valley hydrogeology via Earth Fax, a consulting company.

As part of this inspection, we toured the underground workings. After entering the portal we walked on level ground for about 200 feet. The main tunnel then drops at a 12 degree dip towards the west. We walked approximately another 400 yds before reaching the bottom of the mine. The bottom of the mine drops @220 feet from the front portal. The portal is located at the 6820 contour, the bottom of the mine is located at the 6616 contour. The mine workings are located predominately in the Mossback member of the Chinle formation.

Except for the entrance of the mine, where rainwater had dampened the entrance, I saw no evidence of water. I was also informed by the operator, Mike Shumway, that the mine has always been dry.

The main environmental concern is groundwater degradation from the deposit of the vanadium wastes. We detected no water seepage in the mine workings. None in the ceiling or walls. I walked back into several of the connecting lateral drifts, where the operator indicated the waste material will be located. I saw no sign of seepage. I saw no sign of water sumping in lowest section of the mine. The operator indicated that none of the material will be stored this low. It will be stored in the upper laterals only.

After speaking to Mr. Shoemaker and Mr. Morris, we agreed that the next step would be to meet with DWQ and DRC, to work out details for their approval of the project. I indicated to Molycorp, that there was still a chance that DWQ would ask for the submittal of a groundwater discharge permit. Permitting could be accomplished without a groundwater discharge permit, if the potential impacts to groundwater are designated de minimus. I indicated I would set up the meeting. Molycorp indicated that they would like to proceed with the approval as soon as possible.

I explained that Molycorp would have to fill out a transfer form, submit a reclamation surety and fill out a reclamation contract to complete the transfer from W.K. Enterprises to Molycorp. Molycorp would also assume all reclamation responsibilities for the site. They indicated that the regrading, portal sealing, and road closure needed at the site would be no problem. They also indicated that they hoped to leave the site open for awhile longer, and would not be completing reclamation in the immediate future. The site would be maintained to prevent environmental hazards and to provide for public safety, by stabilizing the site and locking up the portal entries.

jb
cc: Dave Shoemaker, Molycorp
Wilene Shumway, WK Enterprises
Larry Anderson, DRC
Larry Mize, DWQ
Sal Venticinque, BLM
Lowell Braxton, DOGM
M037022

M/037/022

Drawings and Photographs of Site Features

The photographs in Appendix 5 show the salient site features:

1.) View looking north from the top of the pile showing the La Sal Mountains, taken in November 1991. Scrap cars/metal are piled for removal.
2.) View looking north from the top of the pile.
3.) View looking north from southwest corner of the pile. Grids are being scraped. The Lisbon Valley Gas Plant is in the background.
4.) View looking south up the slope of Deer Neck Mesa.
5.) Old foundation on the southern edge of the pile.
6.) View from the south looking down on the pile and old foundations.
7.) Cliffs of Deer Neck Mesa southeast of the pile.

Physical, Radiological and Engineering Properties of the Proposed Cover

The pile contains approximately **20,000** cubic yards (as of **2/21/92**) of contaminated material. The reclaimed pile consists of the following four distinct layers with the following properties:

1. Vanadium Tailings

The base of the pile consists of vanadium mill tailings. This bottom layer is a maximum of twelve feet thick and consists of 4,530 tons (3,424 cubic yards) of material. The radiological and engineering properties of the tailings are described in Appendix 6. The tailings are listed as Sample #2 (light brown fine sand) in the letter from Inberg-Miller dated 7/8/91. The emanation coefficient and radium content of the tailings are described in the two reports from Energy Labs Inc. dated 12/6/91 and 12/19/91. Chemical analyses of tailings/contaminated material are included in the report dated 5/2/91 from ELI. Sample numbers 2, 3, 4, 5, 9, 10, 13 and 14 represent tailings or contaminated soil material. This report includes TCLP data on the tailings/contaminated material. The tailings themselves comprise **3,424 cubic yards [at ±1.323 tons/cy]** of material and are **12** feet thick at their thickest point against the northern slope of Deer Neck Mesa.

2. Contaminated Soils

The tailings are covered by a layer of contaminated soil scraped from the surface of the site. These contaminated soils consist of **12,617** cubic yards of material. The engineering data, chemical and radiometric analyses for this material is included in Appendix 7. The letters from Inberg-Miller dated 1/15/92 and 3/3/92 contain a Proctor density curve, specific gravity and natural moisture content for the contaminated soil called "radioactive soil or red sand/reddish brown silty fine sand" in their report. The radiometric properties of the soil vary widely. Radium values range from **5.8** pCi/gr (the old cutoff value, now 6.7 as per the letter from Larry F. Anderson, Director, Division of Radiation Control, in Appendix 16), up to highs of over **200** pCi/gram. The cutoff values for the grids are 5 pCi/gram above accepted background (5 pCi/gr + 1.7 pCi/gram = 6.7 pCi/gram). Samples 2, 5, 7, 10 and 14 in the letter/report dated 5/2/91 from ELI represent contaminated soil material. The contaminated soils are approximately **eight** feet thick. Sample #91-47144 in the final letter from ELI in Appendix 7 lists the emanation coefficient for the contaminated soil.

The contaminated soils/tailings pile are shaped and sloped to the following specifications:

a. Side Slopes (from pile crest to pile toe)

Approximately **four to one.**

b. Top slope

Sloped at a **8.7%** grade from a high at the pile's south edge to a low intersecting bedrock at the northern toe of the pile.

The upper **eight (8)** inches of the contaminated soil on the pile should be wet to a moisture content range of **8% to 10.5%** (the maximum moisture of 10.5% is optimum moisture minus **2%**) as specified by Larry F. Anderson, Director, Division of Radiation Control, in a meeting on 12/12/91. This design should give the material a lab curve density of approximately **112** lb/cubic ft.

INBERG-MILLER ENGINEERS
1120 EAST "C" STREET CASPER, WYOMING 82601-2195 307-577-0806

July 8, 1991 5393-CM

Minerals Exploration Company
P. O. Box 1500
Rawlins, WY 82301

ATTENTION: OSCAR PAULSON

RE: POROSITY DETERMINATION RESULTS

Gentlemen:

We have completed the porosity tests of the two samples as you have requested. The estimated results are as follows:

	Assumed Specific Gravity	Porosity	Moisture Content %	Dry Density g/cc
Sample #1 - Red, sandy clay	2.70	.411	8.4	1.59
Sample #2 - Light brown, fine sand	2.65	.406	0.5	1.57

Please note that these results were based on the "loose" soil samples which were delivered to our laboratory. We attempted to simulate field conditions as much as possible. However, the actual in-situ porosity may vary some from lab results depending on the actual in-situ density.

If you have any questions regarding the results, please do not hesitate to call.

Sincerely,

INBERG-MILLER ENGINEERS

Steven F. Moldt (cag)

Steven F. Moldt, P.E.
Vice President

JDF:cag:ltr

ENERGY LABORATORIES

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ANALYSIS REPORT - MINERALS EXPLORATION COMPANY

Sample I.D.:	Dry Valley Tailings
Sample Date:	11-91
Report Date:	12-19-91
Sample Number:	91-41649

RADIOMETRIC:

Emanation Coefficient	0.0514

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ANALYSIS REPORT - MINERALS EXPLORATION COMPANY

Sample I.D.:	Dry Valley Tailings
Sample Date:	11-13-91
Report Date:	12-06-91
Sample Number:	91-41903

MAJOR IONS:

Cond (mmhos/cm)	8.29
pH (units)	187

RADIOMETRIC pCi/g:

Ra226	82.1
Ra Prec. +/-	0.6
Ra226 - Gamma	85.9
Ra Prec. +/-	3.2
Emanation Coefficient, %	0.051
Ra226, pCi/l - Extraction	4.0
Ra226 Prec. +/-	0.5

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SOIL ANALYSIS REPORT - MINERALS EXPLORATION COMPANY

Sample I.D.:	#1	#2	#3	#4	#5	#6	#7
Sample Date:	04-91	04-91	04-91	04-91	04-91	04-91	04-91
Report Date:	05-02-91	05-02-91	05-02-91	05-02-91	05-02-91	05-02-91	05-02-91
Sample Number:	91-8211	91-8212	91-8213	91-8214	91-8215	91-8216	91-8217
	Totals	Totals	Totals	Totals	Totals	Totals	Totals
MAJOR IONS ug/g:							
Ca			8876				
Mg			2889				
Na			528				
K			779				
SiO2			N/A				
TRACE METALS ug/g:							
Al			4579				
As			13.7				
Ba			77.13				
Be			0.20				
Bi			0.55				
B			0.98				
Cd			1.38				
Co			2.85				
Cr			3.43				
Cu			6.87				
Fe			3083				
Au			1.48				
Li			8.5				
Pb			17.57				
Mn			96.3				
Mo			3.45				
Ni			3.75				
P			94.85				
Sr			29.43				
Ag			0.65				
Sn			3.10				
Ti			36.27				
W			3.78				
V	116	1597	1283	1063	631	78.9	221
Zn			35.8				
RADIOMETRIC pCi/g:							
U (pCi/l)	6.2	318.4	186.5	141.5	112.6	8.4	29.5
Ra226	2.6	122	73.6	61.4	45.8	3.5	13.2
Ra Prec. +/-	0.1	0.9	0.7	0.7	0.6	0.2	0.3

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To: Minerals Exploration
P.O. Box 1500
Casper, WY 82602

Lab #: 91-8211
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D. #1
Sampled 04-91
Submitted 04-04-91

	CAS #	Regulatory Limit, mg/l	Min. Report Limit, mg/l	Uncorrected for Spike Recovery Result, mg/l in Extract	Corrected for Spike Recovery Result, mg/l in Extract
METALS					
Arsenic	7440-38-2	5.0	0.50	<0.50	<0.50
Barium	7440-39-3	100.0	10.0	<10.0	<10.0
Cadmium	7440-43-9	1.0	0.10	<0.10	<0.10
Chromium	7440-47-3	5.0	0.50	<0.50	<0.50
Lead	7439-92-1	5.0	0.50	<0.50	<0.50
Mercury	7439-97-6	0.20	0.02	<0.02	<0.02
Selenium	7482-49-2	1.0	0.10	<0.10	<0.10
Silver	7440-22-4	5.0	0.50	<0.50	<0.50
CORROSIVITY	SW-846 9040	<2 & >12.5		----	7.48

Q.A. MANAGER: R.A. Gearhart
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To: Minerals Exploration Company
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Lab #: 91-8211
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D.: #1
Sampled 04-91
Submitted 04-04-91

METALS	Spike Concentration, mg/l	Spike % Recovery
Arsenic	0.50	85
Barium	1.00	102
Cadmium	0.10	101
Chromium	0.50	103
Lead	0.50	101
Mercury	0.20	89
Selenium	0.10	100
Silver	0.50	82

Q.A. MANAGER: R.A. Hawley
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To: Minerals Exploration
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Lab #: 91-8212
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D. #2
Sampled 04-91
Submitted 04-04-91

METALS	CAS #	Regulatory Limit, mg/l	Min. Report Limit, mg/l	Uncorrected for Spike Recovery Result, mg/l in Extract	Corrected for Spike Recovery Result, mg/l in Extract
Arsenic	7440-38-2	5.0	0.50	<0.50	<0.50
Barium	7440-39-3	100.0	10.0	<10.0	<10.0
Cadmium	7440-43-9	1.0	0.10	<0.10	<0.10
Chromium	7440-47-3	5.0	0.50	<0.50	<0.50
Lead	7439-92-1	5.0	0.50	<0.50	<0.50
Mercury	7439-97-6	0.20	0.02	<0.02	<0.02
Selenium	7482-49-2	1.0	0.10	<0.10	<0.10
Silver	7440-22-4	5.0	0.50	<0.50	<0.50
CORROSIVITY	SW-846 9040	<2 & >12.5		----	8.50

Q.A. MANAGER: R.A. Laarkig
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Lab #: 91-8212
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D.: #2
Sampled 04-91
Submitted 04-04-91

METALS	Spike Concentration, mg/l	Spike % Recovery
Arsenic	0.50	85
Barium	1.00	102
Cadmium	0.10	101
Chromium	0.50	103
Lead	0.50	101
Mercury	0.20	89
Selenium	0.10	100
Silver	0.50	82

Q.A. MANAGER: R.A. Laskig
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To: Minerals Exploration
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Lab #: 91-8213
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

Sample I.D. #3
Sampled 04-91
Submitted 04-04-91

	CAS #	Regulatory Limit, mg/l	Min. Report Limit, mg/l	Uncorrected for Spike Recovery Result, mg/l in Extract	Corrected for Spike Recovery Result, mg/l in Extract
METALS					
Arsenic	7440-38-2	5.0	0.50	<0.50	<0.50
Barium	7440-39-3	100.0	10.0	<10.0	<10.0
Cadmium	7440-43-9	1.0	0.10	<0.10	<0.10
Chromium	7440-47-3	5.0	0.50	<0.50	<0.50
Lead	7439-92-1	5.0	0.50	<0.50	<0.50
Mercury	7439-97-6	0.20	0.02	<0.02	<0.02
Selenium	7482-49-2	1.0	0.10	<0.10	<0.10
Silver	7440-22-4	5.0	0.50	<0.50	<0.50
CORROSIVITY	SW-846 9040	<2 & >12.5		----	8.60

Q.A. MANAGER: R.A. Laehuig
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To: Minerals Exploration Company
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Lab #: 91-8213
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D.: #3
Sampled 04-91
Submitted 04-04-91

METALS	Spike Concentration, mg/l	Spike % Recovery
Arsenic	0.50	85
Barium	1.00	102
Cadmium	0.10	101
Chromium	0.50	103
Lead	0.50	101
Mercury	0.20	89
Selenium	0.10	100
Silver	0.50	82

Q.A. MANAGER: R.A. Starling
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To: Minerals Exploration
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Lab #: 91-8219
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D. #9
Sampled 04-91
Submitted 04-04-91

	CAS #	Regulatory Limit, mg/l	Min. Report Limit, mg/l	Uncorrected for Spike Recovery Result, mg/l in Extract	Corrected for Spike Recovery Result, mg/l in Extract
METALS					
Arsenic	7440-38-2	5.0	0.50	<0.50	<0.50
Barium	7440-39-3	100.0	10.0	<10.0	<10.0
Cadmium	7440-43-9	1.0	0.10	<0.10	<0.10
Chromium	7440-47-3	5.0	0.50	<0.50	<0.50
Lead	7439-92-1	5.0	0.50	<0.50	<0.50
Mercury	7439-97-6	0.20	0.02	<0.02	<0.02
Selenium	7482-49-2	1.0	0.10	<0.10	<0.10
Silver	7440-22-4	5.0	0.50	<0.50	<0.50
CORROSIVITY	SW-846 9040	<2 & >12.5		----	8.91

Q.A. MANAGER: R.A. Laarhuis
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To: Minerals Exploration Company
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Lab #: 91-8219
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

Sample I.D.: #9
Sampled 04-91
Submitted 04-04-91

METALS	Spike Concentration, mg/l	Spike % Recovery
Arsenic	0.50	85
Barium	1.00	102
Cadmium	0.10	101
Chromium	0.50	103
Lead	0.50	101
Mercury	0.20	89
Selenium	0.10	100
Silver	0.50	82

Q.A. MANAGER: R.A. Gearheart
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To: Minerals Exploration
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Lab #: 91-8224
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D. #14
Sampled 04-91
Submitted 04-04-91

METALS	CAS #	Regulatory Limit, mg/l	Min. Report Limit, mg/l	Uncorrected for Spike Recovery Result, mg/l in Extract	Corrected for Spike Recovery Result, mg/l in Extract
Arsenic	7440-38-2	5.0	0.50	<0.50	<0.50
Barium	7440-39-3	100.0	10.0	<10.0	<10.0
Cadmium	7440-43-9	1.0	0.10	<0.10	<0.10
Chromium	7440-47-3	5.0	0.50	<0.50	<0.50
Lead	7439-92-1	5.0	0.50	<0.50	<0.50
Mercury	7439-97-6	0.20	0.02	<0.02	<0.02
Selenium	7482-49-2	1.0	0.10	<0.10	<0.10
Silver	7440-22-4	5.0	0.50	<0.50	<0.50
CORROSIVITY	SW-846 9040	<2 & >12.5		----	8.36

Q.A. MANAGER: R.A. Gushing
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To: Minerals Exploration Company
P.O. Box 1500
Casper, WY 82602

Lab #: 91-8224
Date: 05-02-91

LABORATORY REPORT
for
WASTE ANALYSIS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
Sample I.D.: #14
Sampled 04-91
Submitted 04-04-91

METALS	Spike Concentration, mg/l	Spike % Recovery
Arsenic	0.50	85
Barium	1.00	102
Cadmium	0.10	101
Chromium	0.50	103
Lead	0.50	101
Mercury	0.20	89
Selenium	0.10	100
Silver	0.50	82

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